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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,552	04/02/2004	Mirsaid Bolorforosh	2004P03346US	2523

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Intellectual Property Department
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EXAMINER	
KITOV, ZEEV	
ART UNIT	**PAPER NUMBER**
2836	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H:P.

Office Action Summary	Application No.	Applicant(s)	
	10/817,552	BOLORFOROSH ET AL.	
	Examiner	Art Unit	
	Zeev Kitov	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 7, 9 - 16, 18 - 21* is/are rejected.

7)☒ Claim(s) *8 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *04/02/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "a signal trace connected with the electrode" of Claim 2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. A reason for that is in a following phrase: "a signal trace connected with the electrode". A role of the signal trace is unclear. The signal trace connected with the electrode is not described in the Specification. For purpose of examination it was interpreted as "a terminal part of the connecting wire".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 7, 12 - 15, 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Radziemski et al. (US 6,737,789). Regarding Claims 1 and 20, Radziemski et al. disclose following elements: a capacitive membrane ultrasound transducer (elements 205 in Fig. 6), which has a membrane (element 102 in Fig. 1) and the conductors connected with the membrane (elements 113, 115 in Fig. 6), and a voltage limiting circuit connected with the conductor (elements 352, 354 in Fig. 6, col. 9, line 49 – col. 10, line 13).

Regarding Claims 3 and 15, Radziemski et al. disclose the voltage limiting circuit including one Zener diode connected between the conductor and a ground (element 354 in Fig. 6).

Regarding Claim 4, Radziemski et al. disclose two Zener diodes in series with opposite polarities (elements 352, 354 in Fig. 6).

Regarding Claim 7, Radziemski et al. disclose first and second electrodes associated with the membrane (elements 112 and 114 in Fig. 1); wherein the voltage limiting circuit comprises a switch operable to short the first electrode to the second electrode (in condition of over voltage, elements 352 and 354 short circuit the electrodes).

Regarding Claim 12, Radziemski et al. disclose (a) generating electrical signals with variation between a first electrode on a membrane and a second electrode (col. 9, lines 49 – 57); and (b) limiting a voltage between the first and second electrodes with a protection circuit (elements 352, 354 in Fig. 6, col. 9, line 58 – col. 10, line 13).

Regarding Claim 13, Radziemski et al. disclose holding a voltage between the first and second electrodes substantially constant (which is inherent in the nature of the Zener diode circuit; the voltage drop across two Zener's is equal to breakdown voltage of one Zener plus about 0.6 V drop across another, forward biased diode) where the voltage may exceed a breakdown voltage of the membrane.

Regarding Claim 14, Radziemski et al. disclose draining current away from

at least one of the first and second electrodes (through resistor 356 in Fig. 6), wherein the drain in current limits a voltage difference between the first and second electrodes (col. 10, lines 3 – 15).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Radziemski et al. in view of Dvorsky (US 2,702,318). As was stated above, Radziemski et al. disclose all the elements of Claim 1. Regarding Claim 2, it further discloses a flexible membrane and the conductor including an electrode on the flexible membrane (elements 112, 114 in Fig. 1). However, regarding Claim 2, they do no not disclose a void adjacent to the membrane and the conductor having a terminal part connected to the electrode. Dvorsky discloses a void adjacent to the membrane (element 17 in Fig. 1) and the conductor having a terminal part connected to the electrode (a terminal part of the cable contacting the electrode/connector 28 in Fig. 1). Both references have the same problem solving area, namely providing the piezo electric acoustic transducer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Radziemski et al. solution by adding the void adjacent to the membrane according to Dvorsky, because as Dvorsky states

(col. 3, lines 37 – 46), the void (resonance chamber) is necessary to obtain better directional and response characteristics in the particular frequency range. As to a terminal portion of the cable, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Radziemski et al. solution by stripping the terminal portion of the connecting cable and by connecting individual wires to the electrodes, because it is common practice in the acoustic and microphone design to strip a terminal portion of the cable thus releasing the wires in order to make the terminal connection more flexible and easier connectable.

Claims 5, 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Radziemski et al. in view of Kim (US 5,859,758). As was stated above, Radziemski et al. disclose all the elements of Claim 1. However, regarding Claims 5 and 6, they do no not disclose the first and second diodes connected to the positive and negative voltages. Kim discloses the first and second diodes (elements 1 and 2 in Fig. 1a) connected to the positive and negative voltages (Vdd and Vss in Fig. 1a), and protecting the internal circuit against over-voltages of both positive and negative polarities appearing at the input pad (col. 1, line 25 – col. 2, line 15). Both references have the same problem solving area, namely providing the over-voltage protection for the electronic circuits. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Radziemski et al. solution by adding the non-Zener diodes connected to the positive and negative power sources according to Kim, because even though the reference circuit has some connection to

the ground through resistor (element 356 in Fig. 6), its main path of the high voltage discharge is through a couple of Zener diodes, when one of them is always in an avalanche breakdown regime with a substantial voltage drop across itself. Therefore, an ability of Zener diodes to withstand substantial discharge current is limited due to a power dissipation limit. In contrast, the Kim circuit has non-Zener diodes connected such that the discharging diode is always forward biased with a voltage drop across itself of about 0.7 V only, and therefore can withstand substantially higher discharge currents without being burned.

Claims 9 – 11, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Radziemski et al. in view of Wagner et al. (US 5,430,595) and Court Decision *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965). As was stated above, Radziemski et al. disclose all the elements of Claim 1. However, regarding Claims 9 - 11, 18, 19, they do no not disclose the voltage limiting circuit being positioned at different locations such as within a transducer probe, integrated with preamplifier, or within a transducer connector. Wagner et al. disclose the protecting diodes (elements 21, 22 in Fig. 2) being positioned adjacent to the protected elements (transistors 41, 42 in Fig. 2, col. 7, lines 3 – 19). Both references have the same problem solving area, namely protecting the electronic circuits against over-voltages. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Radziemski et al. solution by placing the protecting diodes adjacent to the protected element, i.e. within a transducer probe, integrated with the preamplifier,

or within a transducer connector of an imaging system (again to protect the preamplifier), because as Wagner et al. state (col. 7, lines 3 – 19), it is done to minimize the resistance between the anode of the diode and the protected element (transistor).

Additionally, according to the Court Decision, mere integration of previously known elements does not present an invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the protecting diodes into the structure of the transducer probe, the preamplifier or into the transducer connector of an imaging system, since it has been held "that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice."

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Radziemski et al. in view of Wagner et al. and Oppelt (US 6,074,346). As was stated above, Radziemski et al. disclose all the elements of Claim 20. However, regarding Claim 21, they do no not disclose the high voltage protection circuit connecting between the capacitive membrane ultrasound transducer and a preamplifier within a transducer probe. Oppelt discloses the high voltage protection circuit (elements 216, 218 in Fig. 6) connecting between the capacitive membrane ultrasound transducer (224 in Fig. 6) and a preamplifier (220 in Fig. 6, col. 5, line 58 – col. 6, line 6). Both references have the same problem solving area, namely providing protection for the electronic equipment against over-voltages. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Radziemski et al. by

adding the protecting diodes located between the piezo transducer and the preamplifier according to Oppelt, because as Oppelt states (col. 5, line 58 – col. 6, line 6), it is necessary to protect the preamplifier input against over-voltages.

As to the protecting diodes location within a transducer probe, Wagner et al. teaches that the protecting diodes (elements 21, 22 in Fig. 2) should be located adjacent to the protected elements (transistors 41, 42 in Fig. 2, col. 7, lines 3 – 19). Both references have the same problem solving area, namely protecting the electronic circuits against over-voltages. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Radziemski et al. solution by placing the protecting diodes adjacent to the protected element, i.e. within a transducer probe, integrated with the preamplifier, or within a transducer connector of an imaging system (again to protect the preamplifier), because as Wagner et al. state (col. 7, lines 3 – 19), it is done to minimize the resistance between the anode of the diode and the protected element (transistor).

Allowable Subject Matter

Claims 8 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. A reason for that is that Claim 8 recites, inter alia, a limitation of the switch shorting the electrodes as being a relay, while Claim 17 recites, inter alia, shorting the first and the second electrodes at time other than during performance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.

Z.K.
07/20/2005

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